Financial Assistance Award

DENALI COMMISSION
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Anchorage, Alaska 99501
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Award Number	01301-00
Award Title	Alaska Center for Energy and Power, Chena Reservoir Study
Performance Period	July 1, 2010 through March 30, 2012

Authority
112 Stat 1854

CFDA Number
90.100

Denali Commission Finance Officer Certification
Ms. Jennifer Price
09/07/2010

Recipient Organization & Address

UNIVERSITY OF ALASKA FAIRBANKS
Alaska Center for Energy and Power
PO BOX 757880
Fairbanks, AK 99775-7880

Phone: (907) 474-6264
Recipient DUNS # 615245164 **TIN #** 926000147

Cost Share Distribution Table

Accounting Code	New Funding		Prior Period Funding		Total
	Denali Commission	Other Contributors	Denali Commission	Other Contributors	
95670000	$195,632.00		$0.00		**$195,632.00**
	$0.00		$0.00		**$0.00**
	$0.00		$0.00		**$0.00**
	$0.00		$0.00		**$0.00**
	$0.00		$0.00		**$0.00**
		$0.00		$0.00	**$0.00**
		$0.00		$0.00	**$0.00**
		$0.00		$0.00	**$0.00**
		$0.00		$0.00	**$0.00**
		$0.00		$0.00	**$0.00**
Total	**$195,632.00**	**$0.00**	**$0.00**	**$0.00**	**$195,632.00**

This Financial Assistance Award approved by the Federal Co-Chair of the Denali Commission constitutes an obligation of federal funding.

Award Conditions to the Financial Assistance Award between the Denali Commission and University of Alaska Fairbanks, Alaska Center for Energy and Power for Chena Reservoir Study, Award No. 01301

Continued on the following pages.

Signature of Authorized Official - Denali Commission	Typed Name and Title	Date
Electronically Signed	Mr. Joel Neimeyer Federal Co-Chair	09/03/2010

AWARD ATTACHMENTS

UNIVERSITY OF ALASKA FAIRBANKS 01301-00

1. Award Conditions - Alaska Center for Energy and Power, Chena Reservoir Study

Award Conditions to the Financial Assistance Award
Between the Denali Commission and University of Alaska Fairbanks, Alaska
Center for Energy and Power
For Chena Reservoir Study
Award No. 01301
July 2010

1. Scope of Work

Background

Chena Hot Springs is the site of the only geothermal power plant in operation in the State of Alaska. This project was developed in 2006, and was partially funded through a Denali Commission/Alaska Energy Authority grant under the Alaska Energy Cost Reduction grant program. Total funds received were $246,288. Total project costs for construction of the power plant and development of the resource totaled approximately $2,200,000.

Since the start of operation in 2006, the average produced fluid temperatures at Chena Hot Springs have shown an irregular decline. While not necessarily dramatic, it is critical to understand the underlying mechanisms behind this decline. Doing so would both ensure long term sustainability of the Chena geothermal power plant, but also for any other projects that would be developed at similar locations in the future.

This temperature decline was the focus of a data collection study in 2009 which concluded that complex intra-well interactions of the shallow and deep portions of the geothermal system were most likely responsible. In response, a well work-over was performed which led to an increase and stabilization of the producing fluid temperature. At the time of the study there were two active producers and two injector wells and it was relatively simple to predict what the effect of the well work-over might be on the productivity of neighboring wells. However, an additional deep well was drilled during the study and another is planned for summer 2010. As the number of active injection and production wells increase and the number of possible configurations increases, the reservoir is expected to behave in more complex ways.

Project Scope

In order to better understand the Chena geothermal system, a numerical reservoir model will be developed which can be used to make decisions on the production/injection strategy and lifespan of a geothermal project by enabling multiple scenarios, maximizing energy extraction from the system while sustainably producing it. To develop this model, geologic, geochemical, geophysical and well test data from both the shallow geothermal system (less than 1000 ft depth) as well as the deeper system (1000-4000 ft) will be used. Much of the information needed to develop the model already exists for the shallow portion of the geothermal system. However essential temperature, pressure, and particularly well flow volumes data still need to be collected. Information from the newly drilled deep wells combined with the existing reservoir data will permit a comprehensive model of the site to be developed, guiding decision making processes for Chena and other low-temperature geothermal resources that are being considered for development.

The lessons learned from integrating multiple data types and developing an ongoing monitoring plan can be applied to other low temperature geothermal systems in Alaska. Examples of specific, directly transferable knowledge would be: identification of robust flow gauges for use in low temperature remote systems, relative usefulness of different tests, time required for steady state conditions to assert themselves after drilling a new well. Furthermore this project would help develop a geothermal modeling group at UAF which will expedite future modeling of other moderate temperature Alaskan geothermal systems.

Deliverables
The proposed scope of work includes:
- Obtain static temperature logs on accessible wells before/after the new well is drilled
- Perform at least 2 well interference tests during the first 6 months of the project
- Assist with installation of flow gauges on injection and production wells
- Collect flow data on active injection and production wells
- Develop conceptual model of the field utilizing all available data
- Build and test a detailed reservoir model which mimics behavior of the system

The bulk of the project time will be devoted to building a robust model.
Deliverables include:
- Raw data within an integrated database,
- Well test interpretations,
- Preliminary summary of reservoir dynamics
- Detailed reservoir model.
- A written report and public presentation of the study results at a venue approved by the Commission

Budget – Total Budget is $195,632
The budget for this project is $195,632 and includes both direct and indirect costs to complete the research, collect samples and analyze, write report and disseminate report findings.

Direct Costs - $139,078
Senior Personnel - *$18,800*
Funding to support 348 hours (roughly 2 months) is requested for the Principal Investigator.

Other Personnel - *$15,918*
Funding to support 760 hours of salary over the life of the project is requested for one undergraduate Research Associate, who will contribute to data collection and modeling; 40 hours is requested for a staff editor who will contribute to report preparation.

Graduate Student Research Assistant - *$30,124*
Support is requested for one Masters level Graduate Student Research Assistant for one year. Students work 20 hours per week during the academic year (760) and 40 hours per week during the summer (560), for a total of 1320 hours.

Fringe Benefits - *$10,329*
Staff benefits are applied according to UAF's benefit rates for FY10, which are negotiated with the Office of Naval Research (ONR) annually. Rates are 31.9% for faculty, 57% for classified staff, and 8% for temporary staff and graduate students (summers only). Health insurance costs of $1500 for the graduate student are included.

Tuition and Related Support - *$13,680**
UAF requires that any graduate student supported by a research project over the course of the academic year also receive tuition and related support.

Travel - *$8,864*
Travel funds are requested to support field activities, planning meetings, and conference participation for report dissemination. All airfare costs are estimated based on current ticket pricing and round-trip fares. Per diem is estimated based on current US Government figures for each location and on UA Board of Regents policy.

Materials & Supplies - *$19,663*
This category includes modeling/mapping software, field laptop batteries, cables, field data loggers, lab supplies and field supplies. Equipment will be used after grant to support further geothermal research activities around Alaska.

Publication & Dissemination - *$2,000*
Publication and other costs associated with research results dissemination such as printing and inclusion of color in journal articles.

Consulting Geologist Services - *$12,000*
This contractor will contribute to analyses and mapping efforts. Funds of $12,000 are requested to support work by a geothermal consultant, who will contribute to analyses and report preparation.

Sample analysis - *$7,700*
This funding will support water rock sample analyses.

Indirect Costs - $56,554
See section 4 below

Budget Summary

Direct Costs	$139,078	
Indirect Costs	$ 56,554	(*Indirect costs are calculated on all Direct Cost categories except of Tuition and Related Support)
Total Budget	**$195,632**	

All Commission funding is intended for use for the scope of work identified in the Award document only. Any balance of funds remaining after the full scope of work has been completed will be returned to the Denali Commission.

2. *Milestones*

The following milestones are identified as the major steps to be completed as part of the project. "Planned" dates for the first milestone are included here. As part of each progress report, recipients shall update the progress toward meeting these milestones (see section 7, Reporting).

Milestone	Planned		Actual		Units	Total Cost At Completion
	Start Date	End Date	Start Date	End Date		
In-Progress	07/01/2010	03/30/2012			0	$0.00
Project Close-out	03/31/2012	06/30/2012			0	$0.00

3. *Award Performance Period*

The Award performance period is July 1, 2010 through March 30, 2012. This is the period during which Award recipients can incur obligations or costs against this Award.

4. *Direct and Indirect Costs*

The cost principles of OMB A-21 are applicable to this Award. Direct costs for this award total $56,554**.**

Facilities and Administration (F&A) Explanation for Chena Reservoir Assessment
F&A is used to cover support staff as well as maintenance and upkeep of existing equipment, facilities, and labs that will be used for this project. Facilities and Administrative (F&A) Costs are negotiated with the Office of Naval Research and for research are calculated at 45.1% of the Modified Total Direct Costs (MTDC). MTDC includes Total Direct Costs minus tuition and other student support, sub-award amounts over $25,000, participant support costs, and equipment.

Specific items that are relevant to this project are listed below. These represent resources currently owned by the University and will be used to support this project. They are not explicitly included in the project budget as individual line items, but are supported under F&A. For this project, these include:

1. Existing computer equipment, phone, fax, and office supplies that will be used to support this research project, but not charged directly to the project.
2. Support for business office staff as well contracts and proposals offices at UAF that assist the research and perform critical functions related to this project.
3. Educational development for student interns working on the project.
4. Database hardware and software licensing costs for storage and analysis of project data that are not charged directly.
5. Office space for the research team, including all staff and contracted participants.
6. Utilities for office space.

Refer to the cost principles regulations for specific details on other allowable charges under this Award.

5. Budget and Program Revisions

The Administrative Circular, 2 CFR Part 215, applies to this Award. Please refer to the Administrative Circular for specific details on revisions to this Award. The Administrative Circular requires that ACEP will inform the Commission in writing (e-mail, letter, or report) at the earliest possible date of any unanticipated project cost overrun, project schedule delays, or changes in the project scope or changed site conditions.

6. Payments

Payments under this Award will be made by electronic transfer in response to a "Request for Advance or Reimbursement", Standard Form 270 (SF-270) submitted by ACEP. Requests for reimbursements may be made as needed. The SF-270 must be submitted to the Denali Commission via fax, e-mail (finance@denali.gov) or mail in order for payment to be processed. The form is available on the OMB website: http://www.whitehouse.gov/OMB/grants/grants_forms.html. Payments shall be made in accordance with 2 CFR Part 215. Please contact the Denali Commission's Finance Specialist at (907) 271-1414 for further information about submitting this form. **No interest will be accrued on these funds.**

7. Reporting

Two forms of project reporting are required under this Award, listed below. ACEP shall submit reports using the Denali Commission's on-line Project Database System, available at www.denali.gov. If there are technical limitations which may prevent the recipient from meeting this requirement, please contact the Program Manager listed in this agreement.

a. **Progress Reports** shall be submitted on a quarterly basis. The first reporting period is July 1, 2010 to September 30, 2010, and quarterly thereafter. Reports are due

within 30 days of the end of the reporting period. Progress reports shall include the following:

i. Total project funding, including both Denali Commission funding and other project funding sources.
ii. The total project expenditures for the project as of the end of the reporting period, including both Denali Commission and Other funding sources.
iii. Updated schedule and milestone information as identified in the Scope of Work
iv. Narrative summary of the project status and accomplishments to date, and address the following questions: is the project on schedule, is the project on budget, and what actions are planned to address any project problems.
v. For minor repair and renovation projects or other non-construction projects, pictures should be provided of before and after, or photos that are representative of the funded activity, to the extent possible. Photos shall be provided in a digital format as part of the on-line report. A short description of the activity and names of those in the photos shall also be provided.

b. **Federal Single Audits** shall be submitted annually, when required. In accordance with OMB Circular A-133, which requires [subpart 200] "Non-Federal entities that expend $500,000 or more in a year in Federal awards shall have a single or program-specific audit conducted for that year in accordance with the provisions of this part [subpart 205]. The determination of when an award is expended should be based on when the activity related to the award occurs."

Recipients shall also submit single audits to the Federal Clearinghouse as designated by OMB. Information can be found on the following web-site: http://harvester.census.gov/sac/

8. Project/Award Close-Out

The project close-out report shall be completed within 90 days of the end of the Award performance period or within 90 days of the completion of the project, whichever is earlier. Recipients must also draw down any remaining funds for expenditures incurred under this award during this 90-day period.

The project close-out report shall be submitted on-line through the Denali Commission's on-line Project Database System, available at www.denali.gov. The project close out will require the recipient to submit the following information:

a. Final data for each item listed in paragraph 7(a) "Progress Reports"
b. Final project expenditures itemized by the following categories: planning & design; materials & equipment; freight; labor; project administration/overhead and other expenses.

c. Acknowledgement of support: For all non-construction projects, the Award recipient shall include an acknowledgement of the Government's support for the project(s) developed under this Award. The format for acknowledgement of the Government's support for non-construction awards will vary with each award and must be agreed upon between the Award recipient and the Denali Commission Project Manager. Denali Commission logo shall be printed on the final report cover. Costs associated with this requirement shall be paid out of the project funding received by the Award recipient from the Denali Commission.

9. Public Policy Laws and Assurances

Award Recipients are required to comply with the public policy laws and assurances on SF 424b. This form must also be signed by a certifying official of the organization. Some of the laws are highlighted below for your reference.

To the maximum extent practicable, considering applicable laws, Funding Recipients shall accomplish the project contemplated by the Award using local Alaska firms and labor.

No portion of this award may be used for lobbying or propaganda purposes as prohibited by 18 U.S.C. Section 1913 or Section 607(a) of Public Law 96-74.

Project level environmental reviews in accordance with the National Environmental Policy Act (NEPA) and the National Historic Preservation Act (NHPA) are required for each project undertaken with Denali Commission funds.

10. Non-Compliance with Award Conditions

Recipients not in compliance with the terms and conditions of this Financial Assistance Award will be notified by the Denali Commission. The Denali Commission will work with the recipient to identify the steps necessary to bring them back into compliance, and will establish an appropriate time frame for the corrections to be made. If the corrections have not been made by the deadline, the Denali Commission reserves the right to either suspend or unilaterally terminate the Financial Assistance Award for non-performance.

11. Program Manager, Financial Manager & Other Contact Information

Denali Commission	**Alaska Center for Energy and Power**
Denali Daniels Program Manager 510 L Street, Suite 410 Anchorage, AK 99501 Phone: 907-271-1189 Fax: 907-271-1415 E-mail: ddaniels@denali.gov	Gwen Holdmann Project Manager 451 Duckering Building Fairbanks, Alaska 99775-5880 Phone: 907-590-4577 Fax: 907-474-6686 Email: gwen.holdmann@uaf.edu

Betty Sorensen Grants Administrator 510 L Street, Suite 410 Anchorage, AK 99501 Phone: 907-271-3415 Fax: 907-271-1415 E-mail: bsorensen@denali.gov	Maggie Griscavage Financial Contact 3295 College Road, 109 ASC Fairbanks, AK 99775-7880 Phone: 907-474-6446 Fax: 907-474-5506 Email: gmgriscavage@alaska.edu

12. Other project specific paragraphs may be added here

In addition to reporting quarterly, ACEP shall meet twice annually with the Commission to report lessons learned and project status.